

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 December 2004 (29.12.2004)

PCT

(10) International Publication Number
WO 2004/114007 A3

(51) International Patent Classification⁷: G02F 1/139,
1/1335

(21) International Application Number:
PCT/US2004/019276

(22) International Filing Date: 15 June 2004 (15.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/465,067 18 June 2003 (18.06.2003) US

(71) Applicant (for all designated States except US): OPTIVA,
INC. [US/US]; 377 Oyster Point Boulevard, #13, South
San Francisco, California 94080 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): PAUKSHTO,
Michael, V. [RU/US]; 820 Peary Lane, Foster City,
California 94404 (US). PALTO, Serguei, P. [RU/RU];
Likhachevskoe sh., bld. 4, aptm., 173 Dolgoprudny,

Moscow, 141700 (RU). SILVERSTEIN, Louis, D.
[US/US]; 9695 E. Yucca Street, Scottsdale, Arizona
95260-6201 (US).

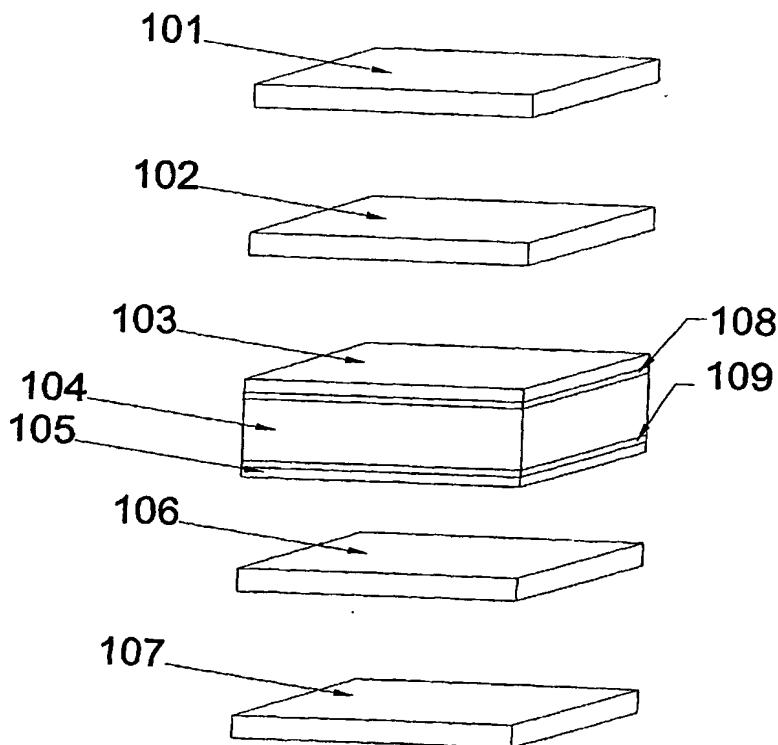
(74) Agents: TEST, Aldo, J. et al.; DORSEY & WHITNEY
LLP, 4 Embarcadero Center, Suite 3400, San Francisco,
California 94111 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW).

[Continued on next page]

(54) Title: SUPER-TWIST NEMATIC LIQUID CRYSTAL DISPLAY USING THIN CRYSTAL FILM POLARIZER



(57) Abstract: A simple, reliable and cost-effective super-twisted nematic liquid crystal display is disclosed. The liquid crystal display is suitable for application in all portable electronic devices due to the reliable and simple design employing a thin crystal film polarizer (101, 107) and is particularly suitable for outdoor display applications due to its increased environmental robustness. The thin crystal film polarizer of negative birefringence also increases the viewing characteristics of the liquid crystal display and provides additional advantages. The disclosed liquid crystal display includes a front and rear polarizer and a super-twisted nematic liquid crystal layer (104), wherein the liquid crystal layer has a twist angle from about 230° to about 250°. The front and rear transmission axes of the polarizers are angularly displaced by about 70° to about 86° relative to each other.



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA,*

SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- *of inventorship (Rule 4.17(iv)) for US only*

Published:

- *with international search report*

(88) Date of publication of the international search report:
26 May 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.